

2-3 Conditional Statements

Conditional statements are statements written in the *if, then* form.

If p, then q. p-hypothesis q-conclusion

$p \rightarrow q$ "if p, then q" or "p implies q"

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Examples:

If it rains, then it pours.

If an angle is a right angle, then it measures 90

If a polygon has exactly 6 sides, then it is a hexagon.

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Examples:

All squares are rectangles.

If $\overset{\times}{\text{it}}$ is a square, then
 $\overset{\times}{\text{it}}$ is a rectangle.

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All cats are animals.

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If the conclusion is true, then true.

If the conclusion is false, then look to the statement to determine the truth value.

Truth Values of Conditionals

Example:

If Robby rests for 10 days, then his ankle will heal.

F Robby rests for 10 days and his ankle did not heal.

T Robby rests for 3 days and his ankle did not heal.

T Robby rests for 10 days and his ankle healed.

T Robby rests for 7 days and his ankle healed.

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Truth Table for Conditional

p	q	$p \rightarrow q$
T	T	T
T	F	F
F	T	T
F	F	T

*

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Example:

If the calculator is on sale, then you buy it.

T The calculator is full price and you buy it.

T The calculator is on sale and you buy it.

F The calculator is on sale and you do not buy it.

T The calculator is full price and you do not buy it.

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Related conditionals

Conditional	$p \rightarrow q$
Converse	$q \rightarrow p$
Inverse	$\sim p \rightarrow \sim q$
Contrapositive	$\sim q \rightarrow \sim p$

switch hyp & concl.
negates original
negates converse

If a conditional is true, then the contrapositive must also be true. They are said to be logically equivalent. The same is true for the converse and the inverse.

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		condition	converse	inverse	contra.
p	q	$p \rightarrow q$	$q \rightarrow p$	$\sim p \rightarrow \sim q$	$\sim q \rightarrow \sim p$
T	T	T	T	T	T
T	F	F *	F	F	F *
F	T	T	F *	F *	T
F	F	T	T	T	T

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Example:

All birds are owls.

Conditional:

① If it is a bird, then it is an owl.

Converse:

② If it is an owl, then it is a bird

Inverse:

③ If it is not a bird, then it is not an owl

Contrapositive:

④ If it is not an owl, then it is not a bird.

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Open books to p.78

Oct 2-7:15 AM

HW
p78-79
16-19, 23-26, 28-39, 43

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